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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/823,973	04/03/2001	Kenichiro Mori	684.3170	9679

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EXAMINER

ESPLIN, DAVID B

ART UNIT	PAPER NUMBER
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2851

DATE MAILED: 09/18/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/823,973

Applicant(s)

MORI, KENICHIRO

Examiner

D. Ben Esplin

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 August 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7, 8 and 10-15 is/are rejected.
- 7) ☒ Claim(s) 5, 6, 8 and 9 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 April 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the diffractive optical element disposed at or adjacent the light entrance surface of the internal reflection member must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Objections

Claims 5 and 8 are objected to because of the following informalities:

Claim 5 makes reference to "said multiple beam producing unit" without a proper antecedent basis.

The embodiment found in claim 8 wherein the diffractive optical element is disposed at or adjacent to the light entrance of the internal reflection member is not shown in the drawings or described in the specification and is therefore objected to as being unenabling.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

Claims 1, 2, and 10-15 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S.

Patent No. 6,211,944 to Shiraishi.

FIG. 1 of Shiraishi shows an exposure apparatus including an illumination optical system for illuminating a mask (reticle 27) with light from a light source (exposure light source 1). The illumination system is made up of a diffractive optical element (diffraction grating pattern plate 12) for forming a desired light intensity distribution, and a blocking member (spatial filter 16) for blocking a zeroth order diffraction light produced by the diffractive optical element (col. 6 line 67 – col. 7 line 4). The exposure apparatus shown further includes a projection optical system (projection optical system 29) for projecting a pattern of the mask onto a wafer (wafer 30). Still further, included in the illumination optical system of Shiraishi is an angular distribution transforming unit (lens 11) for transforming an angular distribution of light to be incident on the diffractive optical element. Shiraishi also discloses that a plurality of demountably inserted optical elements in the optical path of the illumination optical system includes the diffractive optical element (col. 6 lines 8 and 9), and the blocking member (col. 3 lines 63-67).

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Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shiraishi as applied to claims 1, 2, and 10-15 above, and further in view of U.S. Patent No. 4,851,978 to Ichihara.

Shiraishi is silent concerning the inclusion of a multiple beam producing unit and a subsequent light projecting element for superimposing light rays from the multiple beam producing unit onto the surface to be illuminated. However, FIG. 1 of Ichihara shows an exposure apparatus with an illumination optical system including a multiple beam producing unit (fly-eye lens 28) and a light projecting element (lens 20) for projecting the light beams onto a surface to be illuminated (reticle R). Thus, it would have been obvious to include a multiple beam producing unit and a light projecting element in the illumination optical system of Shiraishi in order to increase illumination uniformity and decrease speckle (col. 3 lines 31-34 of Ichihara).

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shiraishi in view of Ichihara as applied to claims 3-5 above, and further in view of U.S. Patent No. 4,918,583 to Kudo et al.

Although neither Shiraishi nor Ichihara teach the use of an internal reflection member in an illumination optical system, Kudo shows that the use of an internal reflection member

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(internal reflection type integrator 10 of FIG. 1) in an illumination optical system was well known in the art. Therefore, it would have been obvious to dispose an internal reflection member in the illumination optical system of Shiraishi in view of Ichihara, adjacent to the light source, in order to uniformize the exposure light prior to further processing (col. 4 lines 32-38 of Kudo).

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shiraishi as applied to claims 1, 2, and 10-15 above, and further in view of Kudo.

Although Shiraishi does not teach the use of an internal reflection member in an illumination optical system, Kudo shows that the use of an internal reflection member (internal reflection type integrator 10 of FIG. 1) in an illumination optical system was well known in the art. Therefore, it would have been obvious to dispose an internal reflection member in the illumination optical system of Shiraishi, adjacent to the light source, in order to uniformize the exposure light prior to further processing (col. 4 lines 32-38 of Kudo).

Allowable Subject Matter

Claims 6 and 9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for allowance:

While it is well known in the art to allow optical components of an exposure apparatus to be manually adjusted along an optical axis in order to fine tune the apparatus for optimum

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efficiency and resolution, automated adjustment, along the optical axis, during use, of the angular distribution transforming unit and/or an optical element located between the diffractive optical element and the multiple beam producing unit, along with the other structure and function incorporated into these claims, is not found or taught in the prior art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

Applicant's arguments filed 14 August 2002, have been fully considered but they are not persuasive. The extension of the search required to examine both Groups concurrently would not be as trivial as Applicant suggests.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 6,392,742 to Tsuji discloses an illumination system and projection exposure apparatus that is commonly owned with the subject application but poses possible double patenting issues.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to D. Ben Esplin whose telephone number is (703) 305-4022. The examiner can normally be reached on Mon.-Fri. (8am-4:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Russ Adams can be reached on (703) 308-2847. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3431 for regular communications and (703) 308-7382 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.


DBE

September 12, 2002


RUSSELL ADAMS
SUPERVISORY PATENT EXAMINER
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